

# ANNEX 1 Key Source Analysis

The United States provides an analysis of key sources of emissions found in this report in order to ensure accuracy and reliability of inventory estimates. The IPCC's *Good Practice Guidance* (IPCC 2000) defines a key source category as a "[source category] that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both."<sup>1</sup> By definition, key source categories are sources that have the greatest contribution to the absolute overall level of national emissions in any of the years covered by the time series. In addition, when an entire time series of emission estimates is prepared, a thorough investigation of key source categories must also account for the influence of trends of individual source categories. Therefore, a trend assessment is conducted to identify source categories for which significant uncertainty in the estimate would have considerable effects on overall emission trends. This analysis culls out source categories that diverge from the overall trend in national emissions. Finally, a qualitative evaluation of key source categories should be performed, in order to capture any key source categories that were not identified in either of the quantitative analyses.

The methodology for conducting a key source analysis, as defined by IPCC's *Good Practice Guidance* (IPCC 2000), includes:

- Tier 1 approach (including both level and trend assessments);
- Tier 2 approach (including both level and trend assessments, and incorporating uncertainty analysis); and
- Qualitative approach.

This Annex presents an analysis of key source categories; discusses Tier 1, Tier 2, and qualitative approaches to identifying key sources; provides level and trend assessment equations; and provides a brief statistical evaluation of IPCC's quantitative methodologies for defining key sources.

Table 1-1 presents the key source categories for the United States using emissions data in this report, and ranked according to their sector and global warming potential-weighted emissions in 2003. The table also identifies the criteria used in identifying these source categories (i.e., level, trend, and/or qualitative assessments).

**Table 1-1: Key Source Categories for the United States (1990-2003) Based on Tier 1 Approach**

IPCC Source Categories	Gas	Level	Trend	Qual <sup>a</sup>	2003 Emissions (Tg CO <sub>2</sub> Eq.)
<b>Energy</b>					
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	✓	✓		2,013.8
Mobile Combustion: Road & Other	CO <sub>2</sub>	✓	✓		1,538.5
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	✓	✓		1,134.9
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	✓	✓		635.3
Mobile Combustion: Aviation	CO <sub>2</sub>	✓	✓		171.3
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	✓	✓		125.9
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	✓			118.0
International Bunker Fuels <sup>b</sup>	Several			✓	85.1
Mobile Combustion: Marine	CO <sub>2</sub>	✓			57.5
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	✓	✓		53.8
Mobile Combustion: Road & Other	N <sub>2</sub> O	✓	✓		39.9
Fugitive Emissions from Oil Operations	CH <sub>4</sub>		✓		17.1
<b>Industrial Processes</b>					
Emissions from Substitutes for Ozone Depleting Substances	Several	✓	✓		99.5

<sup>1</sup> See chapter 7 "Methodological Choice and Recalculation" in IPCC (2000).  
< <http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm> >

CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	✓	✓	53.8
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	✓	✓	43.0
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>		✓	15.6
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>		✓	14.1
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	✓	✓	12.3
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O		✓	6.0
PFC Emissions from Aluminum Production	PFCs		✓	3.8
<b>Agriculture</b>				
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	✓		155.3
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	✓	✓	115.0
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	✓	✓	98.2
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	✓		39.1
<b>Waste</b>				
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	✓	✓	131.2
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	✓	✓	36.8
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>		✓	18.8
<b>Subtotal</b>				<b>6,833.5</b>
<b>Total Emissions</b>				<b>6,900.2</b>
<b>Percent of Total</b>				<b>99.0%</b>

<sup>a</sup>Qualitative criteria.

<sup>b</sup>Emissions from this source not included in totals.

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Note: The Tier 1 approach for identifying key source categories does not directly include assessment of uncertainty in emissions estimates.

Table 1-2 provides a complete listing of source categories by IPCC sector, along with comments on the criteria used in identifying key source categories. The comments refer specifically to the year(s) over the course of the entire inventory time series (i.e., 1990 to 2003) in which each source category reached the threshold for being a key source based on a Tier 1 level assessment. The following points should be noted regarding the key sources identified.

Due to the relative quantity of CO<sub>2</sub> emissions from fossil fuel combustion—particularly from mobile combustion in road vehicles and stationary combustion of coal, gas, and oil—these sources contributed most to each year's level assessment. Additionally, the following sources were identified as key sources based on the level assessments for each year (listed in descending order of their 2003 emissions):

- CO<sub>2</sub> emissions from mobile combustion in the aviation sector;
- Direct N<sub>2</sub>O from agricultural soils;
- CH<sub>4</sub> from solid waste disposal sites;
- Fugitive emissions from natural gas operations;
- CO<sub>2</sub> from non-energy use of fuel;
- CH<sub>4</sub> from enteric fermentation in domestic livestock;
- Indirect N<sub>2</sub>O emissions from nitrogen used in agriculture;
- Fugitive emissions from coal mining;
- CO<sub>2</sub> emissions from iron and steel production;
- CO<sub>2</sub> emissions from cement production; and
- N<sub>2</sub>O emissions from mobile combustion in road vehicles.

The remaining key sources identified under the level assessment varied by year. The following five source categories were determined to be key sources using the level assessment for only part of the complete time series (listed in descending order of their 2003 emissions):

- HFC and PFC emissions from substitutes for ozone depleting substances (1996-2003);
- CO<sub>2</sub> emissions from mobile combustion in the marine sector (1990-1997, 1999-2003);
- CH<sub>4</sub> emissions from manure management (1990-2000);
- CH<sub>4</sub> emissions from wastewater handling (1995 and 1997); and
- HFC-23 emissions from HCFC-22 manufacture (1990-1996, 1998).

Although other sources have fluctuated by greater percentages since 1990, by virtue of their size, CO<sub>2</sub> emissions from mobile combustion from road vehicles and stationary combustion of coal are the greatest contributors to the overall trend for 2003. The third largest contributor to the overall trend in 2003 is emissions from substitutes for ozone depleting substances (ODSs). These emissions have grown quickly with the phase out of ODSs under the Montreal Protocol.

Two additional source categories with trends of note are fugitive emissions from coal mining and PFC emissions from aluminum manufacturing, which decreased from 1990 through 2003 by approximately 34 and 79 percent, respectively. Reductions in emissions from coal mining are primarily due to EPA's voluntary coalbed methane capture program and the mining of less gassy coal than in previous years. PFC emissions have decreased primarily as a result of emission reduction activities by the aluminum industry.

The remaining source categories that were identified as key sources based solely on a trend assessment are listed below (listed in descending order of their 2003 emissions).

- CO<sub>2</sub> emissions from waste incineration;
- Fugitive emissions from oil operations;
- CO<sub>2</sub> emissions from ammonia production and urea application;
- SF<sub>6</sub> emissions from electrical equipment; and
- N<sub>2</sub>O emissions from adipic acid production.

In addition to conducting Tier 1 level and trend assessments, a qualitative assessment of the source categories, as described in the IPCC's *Good Practice Guidance* (IPCC 2000), was conducted to capture any key sources that were not identified by either quantitative method. One additional key source was identified using this qualitative assessment. A brief discussion of the reasoning for the qualitative designation is provided below.

- International bunker fuels are fuels consumed for aviation or marine international transport activities, and emissions from these fuels are reported separately from totals in accordance with IPCC guidelines. If these emissions were included in the totals, bunker fuels would qualify as a key source according to the Tier 1 approach. The amount of uncertainty associated with estimation of emissions from international bunker fuels also supports the qualification of this source category as key.

Following the text of this Annex, Table 1-3 through Table 1-16 contain each individual year's level assessment and contain further detail on where each source falls within the analysis. Table 1-17 details the trend assessment for 1990 through 2003.

**Table 1-2: U.S Greenhouse Gas Inventory Source Categories Based on Tier 1 Approach**

IPCC Source Categories	Direct GHG	2003 Emissions (Tg CO2 Eq.)	Key Source Category Flag?	ID Criteria	Comments
Energy					
CO2 Emissions from Stationary Combustion - Coal	CO2	2,013.8	✓	L, T	All years
Mobile Combustion: Road & Other	CO2	1,538.5	✓	L, T	All years
CO2 Emissions from Stationary Combustion - Gas	CO2	1,134.9	✓	L, T	All years

CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	635.3	✓	L, T	All years
Mobile Combustion: Aviation	CO <sub>2</sub>	171.3	✓	L, T	All years
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	118.0	✓	L	All years
Mobile Combustion: Marine	CO <sub>2</sub>	57.5	✓	L	Level in 1990 - 1997, 1999 - 2003
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	6.0			
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.3			
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	125.9	✓	L, T	All years
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	53.8	✓	L, T	All years
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	17.1	✓	T	
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	6.7			
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.4			
Mobile Combustion: Road & Other	CH <sub>4</sub>	2.5			
Mobile Combustion: Aviation	CH <sub>4</sub>	0.1			
Mobile Combustion: Marine	CH <sub>4</sub>	0.1			
Mobile Combustion: Road & Other	N <sub>2</sub> O	39.9	✓	L, T	All years
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	13.8			
Mobile Combustion: Aviation	N <sub>2</sub> O	1.7			
Mobile Combustion: Marine	N <sub>2</sub> O	0.5			
International Bunker Fuels <sup>a</sup>	Several	85.1	✓	Q	
<b>Industrial Processes</b>					
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	53.8	✓	L, T	All years
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	43.0	✓	L, T	All years
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	15.6	✓	T	
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	13.0			
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	4.7			
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	4.2			
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.1			
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>2</sub>	2.8			
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	2.0			
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.4			
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.4			
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	1.3			
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.5			
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.0			
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	+			
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	15.8			
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	6.0	✓	T	
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.8			
Emissions from Substitutes for Ozone Depleting Substances	HiGWP	99.5	✓	L, T	Level in 1996 - 2003
SF <sub>6</sub> Emissions from Electrical Equipment	HiGWP	14.1	✓	T	
HFC-23 Emissions from HCFC-22 Manufacture	HiGWP	12.3	✓	L, T	Level in 1990 - 1996, 1998
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	HiGWP	4.3			
PFC Emissions from Aluminum Production	HiGWP	3.8	✓	T	
SF <sub>6</sub> Emissions from Magnesium Production	HiGWP	3.0			
<b>Agriculture</b>					
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	115.0	✓	L, T	All years
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	39.1	✓	L	Level in 1990 - 2000
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	6.9			
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.8			
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	155.3	✓	L	All years
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	98.2	✓	L, T	All years

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N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	17.5			
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.4			
<b>Waste</b>					
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	18.8	✓	T	
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	131.2	✓	L, T	All years
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	36.8	✓	L, T	Level in 1995, 1997
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	15.9			
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.5			
<b>Land-use Change and Forestry</b>					
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	6.0			
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.4			

<sup>a</sup> Emissions from these sources not included in totals.

+ Does not exceed 0.05 Tg CO<sub>2</sub> Eq.

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

Note: The Tier 1 approach for identifying key source categories does not directly include assessment of uncertainty in emissions estimates.

## Tier 1 Approach

The Tier 1 method for identifying key source categories assesses the impacts of all IPCC-defined source categories on the level and trend of the national emission inventory for the 1990 through 2003 time-series, but works independently of any formal uncertainty analysis. Although conducting a Tier 1 key source analysis is very valuable in improving the U.S. inventory, it would be ideal to incorporate the results of an uncertainty analysis into the key source analysis in order to be able to take into account the level of uncertainty associated with each estimate. Although quantitative uncertainty analyses have been conducted for almost every U.S. emission source, an assessment of the uncertainty of all source categories is required before uncertainties can be taken into account for the key source analysis. See the description of the Tier 2 approach for further explanation.

When using a Tier 1 approach for the *level*, a predetermined cumulative emissions threshold is used to identify key source categories. When source categories are sorted in order of decreasing emissions, those that fall at the top of the list and cumulatively account for 95 percent of emissions are considered key source categories. The 95 percent threshold was established based on an evaluation of several inventories, and was designed to establish a general level where the key source category analysis covers approximately 75 to 92 percent of inventory uncertainty. The Tier 1 approach for the *trend* uses a 95 percent contribution threshold of the cumulative contribution to the trend assessment metric, which was also designed to establish a general level where the key source category analysis covers 90 percent of inventory uncertainty. The Tier 1 method is completed using a simple spreadsheet analysis based on equations for both level and trend assessments that are described in detail below. It is the current approach that the United States is taking to identify key source categories of greenhouse gas emissions until a rigorous uncertainty analysis is completed.

## Tier 2 Approach

IPCC recommends that inventory agencies use the Tier 2 method for identifying key source categories if nationally derived source-level uncertainties are measured. The Tier 2 approach is a more detailed analysis that builds on the Tier 1 approach by multiplying the results of the Tier 1 analysis by the relative uncertainty of each source category. This method is likely to reduce the number of key source categories under consideration. Using the Tier 2 approach, key source categories represent 90 percent of the uncertainty in the national inventory, as opposed to those that sum to the pre-determined cumulative emissions or trend threshold. A simple spreadsheet version accounts for the uncertainty contribution by applying the source category percentage uncertainty estimates to the Tier 1 level and trend assessments.

The U.S. EPA is in the process of developing a robust plan to support data gathering for both a Tier 1 and/or a Monte Carlo level analysis. Where a Monte Carlo approach to uncertainty analysis has been undertaken, uncertainty estimates for each source category have been developed based on (a) source category-specific input variables, such as activity data and emission factors, (b) the statistical properties underlying the input variables (i.e., the characteristics of the probability distributions of the input variables, such as mean and standard deviation in the case of a normal distribution), and (c) the mathematical relationship between the input variables used to estimate the emissions for each source category (e.g., emissions = activity data \* emission factor). As part of a multi-year effort, the United States has already developed quantitative uncertainty estimates for most source categories. However,

because quantitative estimates of uncertainty are not yet available for all source categories, it is premature to conduct a Tier 2 key source analysis at this point. Future inventories will incorporate this Tier 2 approach.

## Qualitative Approach

In addition to conducting a quantitative assessment like the ones described above, a variety of qualitative criteria could be applied to identify additional key source categories. The following qualitative criteria for identifying key source categories have been outlined in the *Good Practice Guidance* (IPCC 2000). A source category should be identified as a key source if:

- Mitigation techniques and technologies are being implemented to reduce emissions from the source category that are expected to be reflected in the inventory estimates;
- Significant changes in emissions (i.e., growth or decline) from the source category is expected in the future;
- High uncertainty is evident for the source category; or
- Unexpectedly low or high emissions, or other order of magnitude discrepancies, are apparent for the source category.

In many cases, the results of this qualitative approach to identifying key source categories will overlap with source categories already defined as key source categories through the quantitative analysis. However, the qualitative method may illuminate a few additional key source categories, which should then be included in the final list of key source categories. However, the application of such qualitative criteria are primarily intended to identify any additional source categories that were “just under” the threshold criteria for the level assessment and not for extremely minor source categories. International bunker fuels is the only source category that is considered key from a qualitative standpoint. International bunker fuel emissions are not included in national totals, and are not considered in the level or trend analyses mentioned above, but are considered key from a qualitative standpoint due to their unique position within the emissions accounting framework.

## Level and Trend Assessments of Key Source Categories

### Level Assessment

A level assessment was performed for years 1990 to 2003. Key sources were identified as the source categories that cumulatively add up to 95 percent of the total emissions for a given year when the source categories are summed, in descending order of magnitude for that year. All source categories that met this threshold for at least one year were considered key sources. Level estimates are based upon the following equation:

$$\text{Source Category Level Assessment} = \text{Source Category} / \text{Total Estimate}$$

$$L_{x,t} = E_{x,t} / E_t$$

Where:

$L_{x,t}$  = level assessment for source x in year t  
 $E_{x,t}$  = emissions estimate for source x in year t  
 $E_t$  = total emissions estimate for year t

### Trend Assessment

A trend assessment was then conducted to evaluate how significantly the difference between the source category's trend and the overall inventory trend affect the overall trend. This assessment was done by multiplying the difference between the source category trend and the total inventory trend by the source category level assessment. Trend assessments were based upon the following equation:

$$\text{Source Category Trend Assessment} = (\text{Source Category Level Assessment}) \times \left| \frac{\text{Source Category Trend} - \text{Total Trend}}{\text{Total Trend}} \right|$$

$$T_{x,t} = L_{x,t} \times \left| \frac{[(E_{x,t} - E_{x,0}) / E_{x,t}] - [(E_t - E_0) / E_t]}{[(E_{x,t} - E_{x,0}) / E_{x,t}] - [(E_t - E_0) / E_t]} \right|$$

Where:

$T_{x,t}$  = trend assessment for source x in year t  
 $L_{x,t}$  = level assessment for source x in year t  
 $E_{x,t}$  and  $E_{x,0}$  = emissions estimates for source x in year t and year 0, respectively  
 $E_t$  and  $E_0$  = total emissions estimate for year t and year 0, respectively  
0 = base year (e.g., 1990)

The following section of this annex evaluates these key source category analyses. The remainder of the annex summarizes the key source categories identified by these analyses, and quantifies their contribution to total level and trend assessments.

## Evaluation of Key Source Identification Methodologies

### Level Assessment

The Tier 1 approach for level assessment defines the source category contribution as the percentage of total inventory emissions from that source category. Only emission source categories are considered.<sup>2</sup> To determine key source categories, the level assessments are sorted in decreasing order, so that the source categories with the highest level assessments appear first. The level assessments are summed until the threshold of 95 percent is reached; all source categories that fall within that cumulative 95 percent for at least one year are considered key source categories.

Since the Tier 1 approach does not explicitly incorporate uncertainties, the level assessment key source categories will be the largest contributors to total emissions but will not necessarily have large contributions to the total uncertainty. Focusing resources on improving the methodologies for estimating emissions from the source categories with the largest emissions is undesirable if those emissions are estimated relatively precisely using the current methodologies. Nevertheless, the analysis (reported in IPCC 2000) of several inventories that have source category uncertainties showed that about 75 to 92 percent of the total uncertainty could be covered by the source categories in the top 95 percent of emissions.

It is important to note that this key source category analysis can be very sensitive to the definitions of the source categories. If a large source category is split into many subcategories, then the subcategories may have contributions to the total inventory that are too small for those source categories to be considered key. Similarly, a collection of small, non-key source categories adding up to less than 5 percent of total emissions could become key source categories if those source categories were aggregated into a single source category. A consistent approach to addressing this issue is available in the *Good Practice Guidance*. Table 7.1 in IPCC (2000) provides guidance and a suggested list of source categories for analysis, although countries are given some discretion based upon their national circumstances.

Some important components of other source categories were not included in the list of IPCC source categories in the key source category chapter of IPCC's *Good Practice Guidance* (IPCC 2000). These source categories include fossil fuel feedstocks, international bunkers, and emissions from U.S. territories. They are potentially large source categories that often are derived from unique data sources using country-specific methodologies, and may have a significant impact on the uncertainty of the estimates.

### Trend Assessment

The Tier 1 approach for trend assessment is defined as the product of the source category level assessment (i.e., source category emissions as a fraction, or percentage, of total emissions) and the absolute difference between the source category trend and the total trend. In turn, the source category trend is defined as the change in source category emissions from the base year to the current year, as a percentage of current year emissions from that source category. The total trend is the percentage change in total inventory emissions from the base year to the current year. Thus, the *source category trend assessment* will be large if the source category represents a large percentage of emissions and/or has a trend that is quite different from the overall inventory trend. Only emissions source

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<sup>2</sup> The level assessment is intended to be applied to sources and to exclude sinks. Although the assessment would still be valid if sinks were included (as unsigned values), the 95 percent threshold by which sources are deemed "key" would lose significance because it is based on an analysis (Flusgrud et al. 1999) of selected inventories where sinks were excluded.

categories are considered.<sup>3</sup> To determine key source categories, the trend assessments are sorted in decreasing order, so that the source categories with the highest trend assessments appear first. The trend assessments are summed until the threshold of 95 percent is reached; all source categories that fall within that cumulative 95 percent are considered key source categories.

It is important to note that the trend assessment calculation assumes that the base and current year source category emission uncertainties are the same. Therefore, the trend assessment is a useful measure in cases where the percentage uncertainties of the base and current year source category emission levels are thought to be the same. However, its usefulness diminishes when individual source category uncertainties are different between the base year and the current year. Such time series inconsistencies could result from changes in data quality or availability over time. As more rigorous methods to determine uncertainties in emission estimates are applied, it may be necessary to revisit the results of the trend assessments.

Another important caveat to the identification of key source categories through the trend assessment is that, while each individual source category's trend assessment provides a measure of how sensitive the overall trend in the inventory is to the trend of a particular source category, the sum of a number of trend assessments does not yield the total sensitivity of the overall trend to changes in all of those source categories. In other words, the cumulative percentages should not be considered a measure of the percentage contributions to the trend from those source categories.

The trend assessment key source categories are also sensitive to the level of aggregation of the source categories; and the IPCC list of source categories may exclude some important, potentially key source category components.

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<sup>3</sup> The trend assessment is intended to be applied to sources and to exclude sinks. Although the assessment would still be valid if sinks were included (as unsigned values), the 95 percent threshold by which sources are deemed "key" would lose significance because it is based on an analysis (Flusgrud et al. 1999) of selected inventories where sinks were excluded.



**Table 1-3: 1990 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1990 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,680.89	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,220.43	0.20	0.48
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	973.63	0.16	0.64
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	609.99	0.10	0.74
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	177.24	0.03	0.77
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	172.23	0.03	0.79
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	140.36	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	128.35	0.02	0.84
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	117.86	0.02	0.86
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	112.63	0.02	0.88
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	107.96	0.02	0.89
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	85.41	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	81.89	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	49.17	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	41.62	0.01	0.94
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	34.98	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	33.28	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	31.19	0.01	0.95
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	29.22	<0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	24.85	<0.01	0.96
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	19.97	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	19.31	<0.01	0.97
PFC Emissions from Aluminum Production	PFCs	18.34	18.34	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	17.85	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	16.26	<0.01	0.98
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	15.20	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	13.02	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.26	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	11.24	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	10.92	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.84	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.12	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	6.31	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.06	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.81	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.54	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	5.53	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.37	<0.01	0.99
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.55	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.30	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.14	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	2.91	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.22	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.98	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.72	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.53	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.32	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.31	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.17	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.86	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.69	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.42	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Severals	0.40	0.40	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.40	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.39	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.37	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.16	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.08	<0.01	1.00

N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.06	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.03	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,088.11</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-4: 1991 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1991 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,677.65	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,208.03	0.20	0.48
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	998.36	0.17	0.64
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	583.53	0.10	0.74
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	172.75	0.03	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	169.37	0.03	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	143.49	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	130.00	0.02	0.84
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	117.11	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	108.29	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	104.08	0.02	0.90
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	79.04	0.01	0.91
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	76.24	0.01	0.92
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	44.05	0.01	0.93
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	43.75	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	33.13	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	32.54	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	30.77	0.01	0.95
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	27.84	<0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	25.78	<0.01	0.96
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	20.24	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	19.17	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	17.83	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	16.76	<0.01	0.97
PFC Emissions from Aluminum Production	PFCs	18.34	15.51	<0.01	0.98
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	14.84	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	13.37	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.18	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	11.97	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	11.01	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	8.01	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.00	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	6.43	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.21	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.87	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.63	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.11	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	4.98	<0.01	0.99
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.50	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.18	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.04	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	2.91	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.28	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.77	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.64	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.40	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.33	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.22	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.17	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.86	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	0.75	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.65	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.41	<0.01	1.00

N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.36	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.35	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.35	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.07	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.06	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,038.39</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-5: 1992 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct		1992 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)			
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,693.10	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,227.95	0.20	0.48
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,035.80	0.17	0.65
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	595.03	0.10	0.74
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	172.64	0.03	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	167.15	0.03	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	138.73	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	129.70	0.02	0.84
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	119.40	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	104.87	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	94.50	0.02	0.90
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	77.05	0.01	0.91
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	75.01	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	57.20	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	46.86	0.01	0.94
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	34.87	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	32.79	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	32.04	0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	26.92	<0.01	0.96
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	25.19	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	19.99	<0.01	0.96
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	19.58	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	18.30	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	16.54	<0.01	0.97
PFC Emissions from Aluminum Production	PFCs	18.34	14.28	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	13.57	<0.01	0.98
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	13.05	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	12.68	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.42	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	11.39	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	8.33	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.87	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.63	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	6.31	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.67	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.40	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.31	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	4.92	<0.01	0.99
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.45	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.07	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	3.94	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	2.91	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.42	<0.01	1.00
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	2.11	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.79	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.62	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.52	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.51	<0.01	1.00

CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.27	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.23	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.79	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.76	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.46	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.43	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.41	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.40	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.09	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.09	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,121.48</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-6: 1993 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct Greenhouse Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1993 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,761.31	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,260.08	0.20	0.48
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,060.84	0.17	0.65
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	587.08	0.09	0.75
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	172.10	0.03	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	168.11	0.03	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	145.66	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	133.22	0.02	0.85
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	118.83	0.02	0.87
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	105.80	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	101.92	0.02	0.90
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	69.86	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	65.16	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	54.18	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	49.07	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	34.62	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	32.80	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	31.82	0.01	0.95
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	29.50	<0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	27.66	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	20.41	<0.01	0.96
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	19.14	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	18.57	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	16.97	<0.01	0.97
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	13.99	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	13.78	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	13.69	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	13.53	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.63	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	11.64	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.82	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.02	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	7.00	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.79	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.88	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.76	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.51	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	4.94	<0.01	0.99
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	4.78	<0.01	0.99
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.48	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.42	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.02	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	3.64	<0.01	1.00

CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.57	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.74	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.63	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.55	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.39	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.30	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.25	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.82	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.61	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.44	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.40	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.38	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.34	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.14	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.11	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.08	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,250.82</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-7: 1994 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct		1994 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)			
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,770.44	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,294.94	0.20	0.48
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,079.18	0.17	0.65
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	588.73	0.09	0.75
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	176.13	0.03	0.77
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	169.09	0.03	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	151.06	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	133.94	0.02	0.85
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	120.40	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	117.75	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	87.29	0.01	0.90
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	73.61	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	65.15	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	53.39	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	50.48	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	36.09	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	35.31	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	31.59	<0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	28.87	<0.01	0.96
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	26.82	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	21.10	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	19.60	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	18.93	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	16.97	<0.01	0.97
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	15.03	<0.01	0.97
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	14.29	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	14.19	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.80	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	12.06	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.05	<0.01	0.98
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	9.80	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	8.29	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	8.21	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.81	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.86	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.12	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	5.51	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.38	<0.01	0.99

CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.15	<0.01	0.99
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.48	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.29	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.02	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.00	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.69	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.85	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.71	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.67	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.52	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.50	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.27	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.83	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.81	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.46	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.43	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.40	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.34	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.13	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.08	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,343.06</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-8: 1995 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1995 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,786.67	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,324.43	0.21	0.49
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,128.30	0.18	0.66
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	542.39	0.08	0.75
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	171.82	0.03	0.77
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	162.40	0.03	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	146.55	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	133.33	0.02	0.84
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	122.97	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	115.50	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	98.17	0.02	0.89
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	74.36	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	65.78	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	55.19	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	51.63	0.01	0.93
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	36.85	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	36.07	0.01	0.94
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	29.89	<0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	27.03	<0.01	0.95
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	24.45	<0.01	0.96
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	21.67	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	20.45	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	19.88	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	18.75	<0.01	0.97
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	17.21	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.13	<0.01	0.98
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	15.74	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	14.22	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	12.90	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.80	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	11.83	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	8.99	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	8.41	<0.01	0.99

Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	8.18	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.62	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	7.36	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.92	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.57	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.27	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.95	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.48	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.30	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.17	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.75	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.87	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.67	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.67	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.53	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.51	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.31	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.80	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.66	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.44	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.40	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.38	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.37	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.19	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.09	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,407.36</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-9: 1996 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct		1996 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)			
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,872.64	0.28	0.28
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,360.36	0.21	0.49
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,148.57	0.17	0.66
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	579.45	0.09	0.75
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	180.13	0.03	0.78
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	158.94	0.02	0.80
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	155.62	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	134.53	0.02	0.84
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	120.52	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	114.01	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	108.39	0.02	0.90
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	68.32	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	63.16	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	53.39	0.01	0.92
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	52.39	0.01	0.93
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	37.08	0.01	0.94
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	35.12	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	34.72	0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	31.12	<0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	30.71	<0.01	0.96
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	24.25	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	20.71	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	20.28	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	18.74	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	17.19	<0.01	0.97
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	17.04	<0.01	0.98
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.03	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	14.41	<0.01	0.98

CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	13.49	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.46	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	12.47	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	8.63	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	8.53	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	8.35	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	7.82	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	6.97	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	6.53	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.12	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.58	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	5.50	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.48	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.24	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	4.01	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.78	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.95	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.75	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.66	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.60	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.55	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.27	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.76	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.75	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.43	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.42	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.41	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.38	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.24	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.08	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,621.20</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-10: 1997 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1997 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,920.24	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,385.64	0.21	0.50
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,152.53	0.17	0.67
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	586.69	0.09	0.76
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	178.96	0.03	0.78
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	155.86	0.02	0.81
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	147.35	0.02	0.83
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	133.63	0.02	0.85
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	120.30	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	118.32	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	96.17	0.01	0.90
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	71.86	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	62.64	0.01	0.92
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	53.12	0.01	0.93
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	46.47	0.01	0.93
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	38.73	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	38.32	0.01	0.94
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	36.39	0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	31.70	<0.01	0.95
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	29.95	<0.01	0.96
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	21.66	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	21.22	<0.01	0.97
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	20.65	<0.01	0.97



Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	18.79	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	17.76	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.34	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	14.68	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	13.69	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.55	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	10.99	<0.01	0.98
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	10.31	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	8.09	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	7.87	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.48	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.38	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	7.24	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	6.34	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	6.32	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.12	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.62	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.35	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	3.84	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.92	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	2.04	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.84	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.74	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.64	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.54	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.25	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.81	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.77	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.45	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.38	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.38	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.32	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.30	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.06	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,677.52</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-11: 1998 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Greenhouse Gas	Direct			
		1990 Estimate (Tg CO <sub>2</sub> Eq.)	1998 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,936.49	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,419.71	0.21	0.50
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,134.77	0.17	0.67
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	573.65	0.09	0.75
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	181.33	0.03	0.78
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	158.63	0.02	0.80
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	138.49	0.02	0.82
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	135.35	0.02	0.85
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	131.79	0.02	0.86
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	116.70	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	109.12	0.02	0.90
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	67.43	0.01	0.91
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	62.76	0.01	0.92
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	56.57	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	53.31	0.01	0.93
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	40.13	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	39.22	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	38.85	0.01	0.95

CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	32.55	<0.01	0.96
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	32.41	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	21.93	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	20.88	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	18.46	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.39	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	17.09	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	17.06	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	14.96	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	13.91	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.38	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	9.05	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.90	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	7.45	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	7.15	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	7.13	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	6.88	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.57	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.14	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	5.99	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.79	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	5.79	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.32	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	3.68	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	3.01	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	2.03	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.82	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.77	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.68	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.59	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.20	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.91	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.79	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.46	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.38	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.35	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.35	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.27	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.05	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,719.75</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-12: 1999 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	1999 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,938.19	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,461.77	0.22	0.50
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,138.03	0.17	0.67
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	578.54	0.09	0.76
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	186.74	0.03	0.79
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	151.10	0.02	0.81
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	141.58	0.02	0.83
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	134.02	0.02	0.85
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	127.39	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	116.78	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	92.31	0.01	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	65.81	0.01	0.91
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	64.38	0.01	0.92

Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	58.89	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	52.46	0.01	0.93
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	42.26	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	39.99	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	38.76	0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	33.65	<0.01	0.96
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	30.42	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	20.61	<0.01	0.96
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	20.12	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.81	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	17.63	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.41	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	16.39	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.45	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.48	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	13.47	<0.01	0.98
PFC Emissions from Aluminum Production	PFCs	18.34	8.96	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	8.29	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	8.06	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	7.32	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	7.23	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.10	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.94	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.16	<0.01	0.99
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	6.01	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.90	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	5.48	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.22	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	3.39	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	3.05	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	2.00	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.85	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.82	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.71	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.54	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.17	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.85	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.77	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.47	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.45	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.38	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.35	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.33	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.07	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.02	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,752.23</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-13: 2000 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct Greenhouse Gas		2000 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)			
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	2,025.62	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,481.40	0.21	0.50
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,188.67	0.17	0.68
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	592.74	0.09	0.76
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	193.18	0.03	0.79
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	156.28	0.02	0.81
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	132.06	0.02	0.83
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	130.68	0.02	0.85

CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	124.71	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	115.60	0.02	0.88
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	107.58	0.02	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	75.01	0.01	0.91
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	65.69	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	63.11	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	56.22	0.01	0.94
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	50.77	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	41.19	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	38.08	0.01	0.95
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	34.34	<0.01	0.96
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	29.79	<0.01	0.96
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	19.62	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	19.59	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	17.98	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.81	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.55	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	15.65	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.56	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	14.00	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	13.31	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.34	8.95	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	7.74	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.49	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	7.34	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	6.30	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	6.04	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.98	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	5.96	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.77	<0.01	0.99
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	5.72	<0.01	1.00
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.18	<0.01	1.00
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	3.18	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	3.12	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	3.00	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.92	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.88	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.72	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.68	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.38	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.21	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.96	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.79	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.51	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.46	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.36	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.35	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.35	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.16	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.10	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.01	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,953.18</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-14: 2001 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct		2001 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas	1990 Estimate (Tg CO <sub>2</sub> Eq.)			
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,959.21	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,493.54	0.22	0.51
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,140.52	0.17	0.67

CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	628.19	0.09	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	183.41	0.03	0.79
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	154.46	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	131.82	0.02	0.84
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	126.21	0.02	0.85
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	120.10	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	114.54	0.02	0.89
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	102.65	0.02	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	83.25	0.01	0.92
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	58.89	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	55.60	0.01	0.93
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	46.82	0.01	0.94
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	42.74	0.01	0.95
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	41.36	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	38.92	0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	34.66	0.01	0.96
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	19.82	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	18.78	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	18.03	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.45	<0.01	0.97
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	16.72	<0.01	0.98
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	15.91	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.63	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	15.42	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.46	<0.01	0.99
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.82	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	7.64	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.95	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	6.67	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.09	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	5.81	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	5.73	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	4.92	<0.01	0.99
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.47	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.15	<0.01	1.00
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	4.11	<0.01	1.00
PFC Emissions from Aluminum Production	PFCs	18.34	4.00	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	2.88	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.79	<0.01	1.00
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	2.55	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	1.86	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.79	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.43	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.33	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.26	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.07	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.82	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.77	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.46	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.40	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.39	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.35	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.35	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.15	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.07	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.01	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,806.94</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-15: 2002 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate	2002 Estimate	Level	Cumulative
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	Greenhouse Gas	(Tg CO <sub>2</sub> Eq.)	(Tg CO <sub>2</sub> Eq.)	Assessment	Total
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	1,973.11	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,520.12	0.22	0.51
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,176.91	0.17	0.68
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	598.77	0.09	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	174.92	0.03	0.79
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	159.90	0.02	0.82
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	130.65	0.02	0.84
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	126.82	0.02	0.85
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	118.81	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	114.61	0.02	0.89
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	92.67	0.01	0.90
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	91.54	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	57.22	0.01	0.92
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	55.08	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	52.43	0.01	0.94
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	43.46	0.01	0.95
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	42.90	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	39.33	0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	35.81	0.01	0.96
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	19.79	<0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	18.78	<0.01	0.97
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	18.57	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.94	<0.01	0.97
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	17.21	<0.01	0.98
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.11	<0.01	0.98
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.68	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	14.71	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.53	<0.01	0.99
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.30	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	6.83	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	6.40	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.37	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	6.23	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.02	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	5.90	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	5.88	<0.01	0.99
PFC Emissions from Aluminum Production	PFCs	18.34	5.24	<0.01	0.99
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	1.00
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.35	<0.01	1.00
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	4.22	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.14	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.86	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	2.66	<0.01	1.00
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	2.65	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	2.00	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.71	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.52	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.34	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.24	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.00	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	0.98	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.71	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.47	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.46	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.43	<0.01	1.00
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.39	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.37	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.14	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.09	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.01	<0.01	1.00

TOTAL	6,088.11	6,858.05	1.00
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Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-16: 2003 Key Source Tier 1 Analysis - Level Assessment**

IPCC Source Categories	Direct	1990 Estimate (Tg CO <sub>2</sub> Eq.)	2003 Estimate (Tg CO <sub>2</sub> Eq.)	Level Assessment	Cumulative Total
	Greenhouse Gas				
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	2,013.80	0.29	0.29
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,538.50	0.22	0.51
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,134.93	0.16	0.68
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	635.30	0.09	0.77
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	171.26	0.02	0.80
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	155.28	0.02	0.82
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	131.17	0.02	0.84
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	125.95	0.02	0.86
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	118.00	0.02	0.87
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	114.98	0.02	0.89
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	99.47	0.01	0.90
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	98.23	0.01	0.92
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	57.45	0.01	0.93
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	53.78	0.01	0.93
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	53.76	0.01	0.94
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	43.03	0.01	0.95
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	39.93	0.01	0.95
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	39.14	0.01	0.96
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	36.77	0.01	0.97
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	18.78	<0.01	0.97
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.53	<0.01	0.97
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.11	<0.01	0.97
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.88	<0.01	0.98
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	15.84	<0.01	0.98
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	15.56	<0.01	0.98
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	14.11	<0.01	0.98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.84	<0.01	0.98
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.98	<0.01	0.99
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	12.33	<0.01	0.99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	6.89	<0.01	0.99
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	6.70	<0.01	0.99
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.43	<0.01	0.99
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.02	<0.01	0.99
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	6.01	<0.01	0.99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.97	<0.01	0.99
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	0.99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	4.72	<0.01	0.99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.34	<0.01	1.00
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	4.22	<0.01	1.00
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.08	<0.01	1.00
PFC Emissions from Aluminum Production	PFCs	18.34	3.80	<0.01	1.00
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	2.97	<0.01	1.00
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.78	<0.01	1.00
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	2.46	<0.01	1.00
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	2.01	<0.01	1.00
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.67	<0.01	1.00
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.52	<0.01	1.00
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.38	<0.01	1.00
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.37	<0.01	1.00
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	1.27	<0.01	1.00
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.02	<0.01	1.00
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.79	<0.01	1.00
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.46	<0.01	1.00
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.46	<0.01	1.00
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.44	<0.01	1.00

N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.39	<0.01	1.00
CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.34	<0.01	1.00
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.14	<0.01	1.00
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.09	<0.01	1.00
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.01	<0.01	1.00
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,900.23</b>	<b>1.00</b>	

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

**Table 1-17: 1990-2003 Key Source Tier 1 Analysis - Trend Assessment**

IPCC Source Categories	Direct GHG	1990	2003	Trend Assessment	Percent Contribution to Trend	Cumulative Total
		Estimate (TgCO <sub>2</sub> Eq.)	Estimate (Tg CO <sub>2</sub> Eq.)			
Mobile Combustion: Road & Other	CO <sub>2</sub>	1,220.43	1,538.50	0.02	18	18
CO <sub>2</sub> Emissions from Stationary Combustion - Coal	CO <sub>2</sub>	1,680.89	2,013.80	0.01	13	31
Emissions from Substitutes for Ozone Depleting Substances	Several	0.40	99.47	0.01	12	43
CH <sub>4</sub> Emissions from Solid Waste Disposal Sites	CH <sub>4</sub>	172.23	131.17	0.01	8	50
CO <sub>2</sub> Emissions from Stationary Combustion - Oil	CO <sub>2</sub>	609.99	635.30	0.01	7	57
CO <sub>2</sub> Emissions from Iron and Steel Production	CO <sub>2</sub>	85.41	53.76	0.01	5	62
Fugitive Emissions from Coal Mining and Handling	CH <sub>4</sub>	81.89	53.78	<0.01	5	67
CO <sub>2</sub> Emissions from Stationary Combustion - Gas	CO <sub>2</sub>	973.63	1,134.93	<0.01	4	70
Mobile Combustion: Aviation	CO <sub>2</sub>	177.24	171.26	<0.01	3	74
Indirect N <sub>2</sub> O Emissions from Nitrogen Used in Agriculture	N <sub>2</sub> O	112.63	98.23	<0.01	3	77
HFC-23 Emissions from HCFC-22 Manufacture	HFCs	34.98	12.33	<0.01	3	80
Fugitive Emissions from Natural Gas Operations	CH <sub>4</sub>	128.35	125.95	<0.01	2	83
SF <sub>6</sub> Emissions from Electrical Equipment	SF <sub>6</sub>	29.22	14.11	<0.01	2	85
CH <sub>4</sub> Emissions from Enteric Fermentation in Domestic Livestock	CH <sub>4</sub>	117.86	114.98	<0.01	2	87
PFC Emissions from Aluminum Production	PFCs	18.34	3.80	<0.01	2	89
N <sub>2</sub> O Emissions from Adipic Acid Production	N <sub>2</sub> O	15.20	6.01	<0.01	1	91
CH <sub>4</sub> Emissions from Wastewater Handling	CH <sub>4</sub>	24.85	36.77	<0.01	1	92
Mobile Combustion: Road & Other	N <sub>2</sub> O	41.62	39.93	<0.01	1	92
CO <sub>2</sub> Emissions from Waste Incineration	CO <sub>2</sub>	10.92	18.78	<0.01	1	93
CO <sub>2</sub> Emissions from Ammonia Production and Urea Application	CO <sub>2</sub>	19.31	15.56	<0.01	1	94
Fugitive Emissions from Oil Operations	CH <sub>4</sub>	19.97	17.11	<0.01	1	95
CO <sub>2</sub> Emissions from Cement Production	CO <sub>2</sub>	33.28	43.03	<0.01	1	95
N <sub>2</sub> O Emissions from Nitric Acid Production	N <sub>2</sub> O	17.85	15.84	<0.01	1	96
CO <sub>2</sub> Emissions from Non-Energy Use of Fuels	CO <sub>2</sub>	107.96	118.00	<0.01	1	96
Direct N <sub>2</sub> O Emissions from Agricultural Soils	N <sub>2</sub> O	140.36	155.28	<0.01	0	97
CH <sub>4</sub> Emissions from Manure Management	CH <sub>4</sub>	31.19	39.14	<0.01	0	97
SF <sub>6</sub> Emissions from Magnesium Production	SF <sub>6</sub>	5.37	2.97	<0.01	0	97
CO <sub>2</sub> Emissions from Aluminum Production	CO <sub>2</sub>	6.31	4.22	<0.01	0	98
Mobile Combustion: Road & Other	CH <sub>4</sub>	4.55	2.46	<0.01	0	98
Non-CO <sub>2</sub> Emissions from Stationary Combustion	CH <sub>4</sub>	7.84	6.70	<0.01	0	98
Mobile Combustion: Marine	CO <sub>2</sub>	49.17	57.45	<0.01	0	99
CO <sub>2</sub> Emissions from Limestone and Dolomite Use	CO <sub>2</sub>	5.53	4.72	<0.01	0	99
CH <sub>4</sub> Emissions from Rice Production	CH <sub>4</sub>	7.12	6.89	<0.01	0	99
N <sub>2</sub> O Emissions from Wastewater Handling	N <sub>2</sub> O	13.02	15.88	<0.01	0	99
PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture	SF <sub>6</sub>	2.91	4.34	<0.01	0	99
N <sub>2</sub> O Emissions from Manure Management	N <sub>2</sub> O	16.26	17.53	<0.01	0	99
CO <sub>2</sub> Emissions from Ferroalloys	CO <sub>2</sub>	1.98	1.37	<0.01	0	99
CO <sub>2</sub> Emissions from Soda Ash Manufacture and Consumption	CO <sub>2</sub>	4.14	4.08	<0.01	0	99
CO <sub>2</sub> Emissions from Natural Gas Flaring	CO <sub>2</sub>	5.81	5.97	<0.01	0	100
CO <sub>2</sub> Emissions from Titanium Dioxide Production	CO <sub>2</sub>	1.31	2.01	<0.01	0	100
CH <sub>4</sub> Emissions from Iron and Steel Production	CH <sub>4</sub>	1.32	1.02	<0.01	0	100
Fugitive Emissions from Abandoned Coal Mines	CH <sub>4</sub>	6.06	6.43	<0.01	0	100
CO <sub>2</sub> Emissions from Phosphoric Acid Production	CO <sub>2</sub>	1.53	1.38	<0.01	0	100
N <sub>2</sub> O Emissions from Forest Land Remaining Forest Land	N <sub>2</sub> O	0.06	0.39	<0.01	0	100
CO <sub>2</sub> Emissions from CO <sub>2</sub> Consumption	CO <sub>2</sub>	0.86	1.27	<0.01	0	100
Mobile Combustion: Aviation	N <sub>2</sub> O	1.72	1.67	<0.01	0	100
CO <sub>2</sub> Emissions from Petrochemical Production	CO <sub>3</sub>	2.22	2.78	<0.01	0	100
N <sub>2</sub> O Emissions from Settlements Remaining Settlements	N <sub>2</sub> O	5.54	6.02	<0.01	0	100
CO <sub>2</sub> Emissions from Lime Production	CO <sub>2</sub>	11.24	12.98	<0.01	0	100
CH <sub>4</sub> Emissions from Petrochemical Production	CH <sub>4</sub>	1.17	1.52	<0.01	0	100



CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy	CO <sub>2</sub>	0.40	0.34	<0.01	0	100
N <sub>2</sub> O Emissions from N <sub>2</sub> O Product Usage	N <sub>2</sub> O	4.30	4.77	<0.01	0	100
Non-CO <sub>2</sub> Emissions from Stationary Combustion	N <sub>2</sub> O	12.26	13.84	<0.01	0	100
Mobile Combustion: Aviation	CH <sub>4</sub>	0.16	0.14	<0.01	0	100
CH <sub>4</sub> Emissions from Silicon Carbide Production	CH <sub>4</sub>	0.03	0.01	<0.01	0	100
Mobile Combustion: Marine	N <sub>2</sub> O	0.39	0.46	<0.01	0	100
N <sub>2</sub> O Emissions from Agricultural Residue Burning	N <sub>2</sub> O	0.37	0.44	<0.01	0	100
N <sub>2</sub> O Emissions from Waste Incineration	N <sub>2</sub> O	0.42	0.46	<0.01	0	100
CH <sub>4</sub> Emissions from Agricultural Residue Burning	CH <sub>4</sub>	0.69	0.79	<0.01	0	100
Mobile Combustion: Marine	CH <sub>4</sub>	0.08	0.09	<0.01	0	100
<b>TOTAL</b>		<b>6,088.11</b>	<b>6,900.23</b>	<b>0.11</b>		

Note: Sinks (e.g., LUCF, Landfill Carbon Storage) are not included in this analysis.

## References

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